

US ENERGY POLICY IS NEEDED; COAL WILL STILL PLAY ROLE

By Randy Gray

Recent comments to the Tribune opposing Highwood Generating Station prompt this commentary. There is a "forest for the trees" problem. Lets take a momentary breather and put the proposed plant into perspective.

Historical perspective

A brief review of factors leading to HGS proposal is needed.

The disastrous deregulation of Montana's power industry in the 1990s led to an implosion of Montana Power and eventual control of its generation assets by PPL and its distribution assets by NorthWestern Energy.

NorthWestern then ran into financial problems and subsequently unilaterally canceled contracts to provide power to the city of Great Falls for its water plant, waste water plant, Civic Center and other city facilities. This resulted in the city of Great Falls taking an unexpected operating budget hit of about a million dollars over the course of a few years. The then-City Commission began investigating alternatives for affordable and reliable power.

About this same time, five Montana rural electric co-ops comprising Southern Montana Electric also were looking for affordable, reliable power because they were being phased out of their supply from the Bonneville Power Administration grid by 2011. This resulted from the expiration of a defined term (thanks to Sen. Mike Mansfield) under which Hungry Horse Dam would be a power source for co-ops on the east side of the Continental Divide.

So the city of Great Falls and the SME began talking about an electric supply partnership that could service them both. The city of Great Falls simultaneously joined a consortium of other major Montana cities, to purchase the assets of NorthWestern. The point of this two pronged energy strategy was to allow some local control over the energy future of the city, its residents, businesses, school district, and airport. The effort to purchase NorthWestern assets was valiant, but eventually unsuccessful.

However, the partnership of city of Great Falls with the co-ops is still on track within the permitting, zoning, and financing processes.

National perspective

The International Energy Agency reports total U.S. electrical generation in 2004 at 4,148 terrawatt-hours. Fifty percent of that was from coal; 20 percent nuclear; 18 percent gas; 7 percent hydro; 3 percent oil; and 2 percent renewable.

Fourteen percent of the 2 percent "renewable" portion was from wind.

For 2030 and based on current government policies and practices, IEA projects total U.S. electrical generation to be 5,913 terawatt-hours. Of that 53 percent will come from coal; 16 percent nuclear; 16 percent gas; 5 percent hydro; 2 percent oil; and 8 percent renewable. Forty-four percent of the "renewable" portion will be from wind.

Under current government policy then, with a 42 percent increase in U.S. electrical production *over the next quarter century*, we will be relying on coal for a higher percentage of a much higher production level. Wind in that same time will increase from 0.28 percent to 3.52 percent of the total, more than a twelve-fold increase, but still a minute share of national electrical production.

Local benefits

HGS will pay the city of Great Falls for city water and sewer services. The plant would use less than 1 percent of the lowest flow of the Missouri in Great Falls. The city has ample reserved water rights to supply the needs of this plant along with a vast amount of other growth.

As a legal matter, unless we perfect these reserved water rights by applying currently unused ones to a beneficial use by 2025 they will be forever forfeited to downstream users. Looking forward 40-50 years, after the useful life of HGS, our perfected water rights from HGS can be put to other beneficial community uses.

Great Falls has excess capacity in both its sanitary and wastewater systems. Having HGS share in that excess capacity reduces unit costs for all of our current water and sewer rate payers.

HGS will annually add \$11 million in property tax collections to state and local government. The current annual property tax collections from the site are \$2,000.

Great Falls has the right mix of assets necessary to a project of this sort and size. These include rail service to bring coal to the site, adequate sanitary and waste water capacity to run the plant, high voltage electrical transmission service to put the power on the regional grid, and a large enough population to provide a labor pool to construct and operate the plant.

Regulated and unregulated outputs of the plant are of concern. However, plant opponents incorrectly refer to the circulating fluidized bed design as a technological dinosaur. It in fact will *meet or exceed* all state and federal emission standards, which

are not lightly set. HGS has committed to installation of state-of-the-art mercury control technology and to meeting the low mercury emission limits required under state law.

Plant CO₂ output, though currently unregulated, is a challenge (unless you are one of the diminishing number of folks who believe global warming is a hoax).

One of the most intriguing opportunities of this plant is its potential as a cutting edge laboratory for developing CO₂ capture technology. Small scale experiments show promise for capturing by sprinkling streams of water laced with CO₂ recovered from plant exhaust over sheets of algae covered plastic.

The sheets are dried then burned in the plant boiler. Bringing this and other promising CO₂ capture technology to scale has immense profit potential for the country or company that perfects it, because it may be possible to retrofit much older thermal plants around the world with a successful capture process.

SME is working with its boilermaker, Alstom Power, the DOE-funded Big Sky Carbon Sequestration Partnership and other public and private entities to investigate the economic and technical feasibility of adding carbon capture and sequestration technology at HGS.

SME is developing a carbon capture and sequestration work plan and will be submitting an application for funding to DOE to be designated one of Alstom's pilot plant projects for the testing of at-scale carbon capture and sequestration. SME is committed to installing carbon capture and sequestration technology at HGS if it is economically and technically feasible.

Department of Energy, industry and university funded research in this arena at this plant could be a lemons to lemonade result.

The proposed circulating fluidized bed plant at HGS is an advanced, yet proven, technology. It can be a laboratory for the kind of research that is necessary to move the world forward in meeting its energy needs without trashing our planet's future.

Another unusual potential for turning a liability into an asset at the plant is use of heat from the plant's cooling water for onsite year-round hydroponic farming.

Diversity of power sources

The upcoming Montana- Alberta transmission line will be anchored by wind farms in the north at Pincer Creek, Alberta and in the south at Judith Gap. That new transmission line will spur construction of other wind farms in between.

Great Falls is once again under consideration for a natural gas powered electric generation plant on the north edge of town. Gas plants are extremely important to a region's generation capacity because they are peak load facilities.

They can quickly ramp their generation up or down to firm up other, more variable sources, such as wind.

Coal, on the other hand, is a base-load source, which burns at the same rate 24/7. And, of course, underlying all of these other current and proposed sources is the hydro capacity of PPL's five local dams. A \$175 million upgrade of Rainbow Dam will increase local hydro generation by 25MW to a total of 224 MW.

The point of all this is that we have an unusually robust and diverse mix of actual and potential electrical power. Reliable and affordable power is an important draw for new electrically intensive digital and data based industry.

A locale with diverse electrical sources has less risk of power outages. The holy grail of the data processing industry is referred to as the five 9s of reliability — meaning that the electric supply is on 99.999 percent of the time.

Locating next to the generation source gives business in this sector a relative advantage by reduced transmission costs. Power reliability and cost advantage coupled with the central Montana's limited occurrences of hurricanes, tornados and earthquakes all are powerful draws for new data processing facilities, a clean industry with high paying jobs.

Not all electrons are created equal — some are more valuable than others. Electrical production that can meet peak power demand is more expensive than base-load production. However, a coal-fired plant can add great value to a power grid by storing electrical capacity in several ways.

For example, a thermal plant in Great Falls can help a hydro facility in the Bonneville grid to build reservoir head during low demand (and low price) night time periods, for release during high demand (and high price) morning and late afternoon times.

Another example will become more prevalent as the market for hybrid cars expands. Plug-in vehicles can charge their batteries during non-peak night-time periods.

This reduces American dependence on unreliable oil sources at ever escalating prices.

World perspective

Much as MEIC wishes it were so, preventing construction of one 250MW coal plant on the high plains of Montana is not going to cause China to abandon its thermal plant construction plans.

I have as much concern about global CO₂ emissions as anyone. But we cannot wean the world from carbon combustion overnight.

In fact, National Geographic ("Carbon's New Math" — October 2007) cites projections by two Princeton researchers that coal will still be a core energy source for both mobile energy demand (such as coal-to- liquids) and stationary energy demand (thermal plants) 50yearsfrom now.

The Princeton researchers outline 15 strategies ("stabilization wedges") calling for prompt and widespread use of existing technology to reduce worldwide CO2 emissions to a sustainable level.

Principal among these strategies are carbon capture and sequestration processes for thermal plants and coal-to-liquids plant.

All of that means coal is on the energy horizon for a long time into the future.

Montana has the most abundant recoverable coal in the world.

Our northern neighbor, Alberta, with its tar-sand formations at Fort McMurray, may be the world's most abundant recoverable source of oil.

Alberta is wrestling with many of the same issues on its tar sands as Montana is with its coal.

New partnerships

Both Montana and Alberta have lots of oil and gas wells that show promise of being geologically suited for CO2 sequestration. What an odd twist, where empty wells and oil fields may be a vital asset in curbing global warming!

Conacher Oil, a producer from the tar sands of Alberta, now owns the Montana Refining plant in Great Falls. We will soon share a major transmission line with Alberta.

There is a community of interest for Montana and Alberta and our respective engineering and mineral science schools to collaborate and become international centers of research and development for extracting the offending emissions out of carbon energy sources.

Pre-industrial revolution atmospheric CO2 in parts per million was 280; by the late 1950s it was 315; now it is 380. (October 2007, National Geographic) Developing and installing carbon capture technology on new coal fired plants as well as on older, less efficient, coal-fired plants around the world is a clear win.

It allows use of the world's most abundant and most distributed power source (coal) without pushing atmospheric CO2 content beyond the 450 parts per million threshold that is emerging as the critical cap.

Leadership and technology

What is certain is that there is no magic energy bullet.

Cold fusion was a wishful fantasy. All power generating systems have their downsides.

Diversity of sources supplying the national grid is as important to the generating industry as diversity in a portfolio is to the investment industry.

Diversity defends against market manipulation, terrorist or saboteur targeting, currency exchange rate fluctuations and all manner of other risk. What is also certain is that we, as a nation, have deferred too long the adoption of a coherent, efficient and effective national energy policy. That leads to the kind of ad hoc system we are now locked into.

A particular plant, be it coal, nuclear, wind, solar, gas, oil or coal-to-liquids, is proposed and the jousting match begins. We need to get beyond endless and fruitless plant-by-plant conflict.

Israel requires by its building code that all new construction has sufficient solar collectors to meet the hot water needs of that building. When an entire nation does this, it develops the market and technology to effect real change.

Big oil companies now refer to themselves as "energy" companies. Nonetheless, they are squeezing their last nickel of return out of their huge investments in traditional carbon-based energy.

Someday, the world will convert from a carbon-based economy to a hydrogen-based economy. Besides fuel cells for mobile power needs, this new world will allow distributed fuel cell generating for stationary electrical needs at individual homes and buildings. Paints, windows, and roofing products imbedded with photovoltaic particles will add to the onboard power sources of buildings.

It is time for citizens around the world to demand their leadership to move this energy conversion along at a more aggressive pace. In the meantime, we still need electricity and various forms of power.

Coal, tar sands, oil shale, and coal-to-liquids plants can all be much more efficient and lighter in their emissions footprint with the right energy policies.

These sources, in turn, will bridge the divide between now and a hydrogen future.

Montana will play a significant role in the hydrogen future as well. Methane, which is abundant in the coal bed methane deposits in Montana, is an efficient source of hydrogen.

Generation of hydrogen by electrolysis is also well served by non-peak (cheap) power that comes from our always-on hydro and coal thermal facilities.

Imagine

The Feb. 28 Tribune front page carried two seemingly unrelated stories. One had to do with USDA Rural Utility Services "pulling the plug on Highwood financing." The RUS action was generally based on lack of funding to the agency.

The other story had to do with a University of Chicago Nobel economist figuring the cost of wars in Iraq and Afghanistan to be between \$3 *trillion* and \$7 trillion dollars. These dots connect.

Imagine if the United States had focused on the Taliban and bin Laden in Afghanistan, where we did have a fight, and had not become diverted to Iraq, where we didn't have a fight.

Further imagine if the *trillion*s of dollars spent in Iraq had been invested in research and development of a national energy policy. At the end of these five years, we would have been much closer to independence from very unstable areas of the world.

We would have moved much closer to sustainable, affordable, diverse, secure, and clean energy sources. Entire new technologies, industries and opportunities would be part of the U.S. economy.

Peace, prosperity and polar bears could much more likely co-exist on earth.

Conclusion

The proposed circulating fluidized bed plant at HGS is an advanced, yet proven, technology. It can be a laboratory for the kind of research that is necessary to move the world forward in meeting its energy needs without trashing our planet's future.

Montana in general and Great Falls in particular are at the crossroads of major current and future energy production.

We can be at the epicenter of the transition to a much brighter energy future for this country and the world.

With challenges come opportunities. Nationally, let's get on with the business of solving the challenges. Locally, let's put electric back in the Electric City.